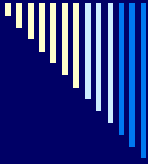


EMS 101

Emergency Medical Services System Overview



William Fales, MD, FACEP

Western Michigan University

Homer Stryker M.D. School of Medicine and

Kalamazoo County Medical Control Authority

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Disclosure

- Faculty Member of NAEMSP National EMS Medical Directors Course and Practicum

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When you think of EMS.....



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EMS Defined

“Emergency medical services” means the personnel, ambulances, ...life support vehicles,... and equipment required for transport or treatment of an individual requiring ...basic or advanced life support.

MCL 333.20904

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EMS System Defined

“Emergency medical services system” means a comprehensive and integrated arrangement of the personnel, facilities, equipment, services, communications, medical control, and organizations necessary to provide emergency medical services and trauma care within a particular geographic region.

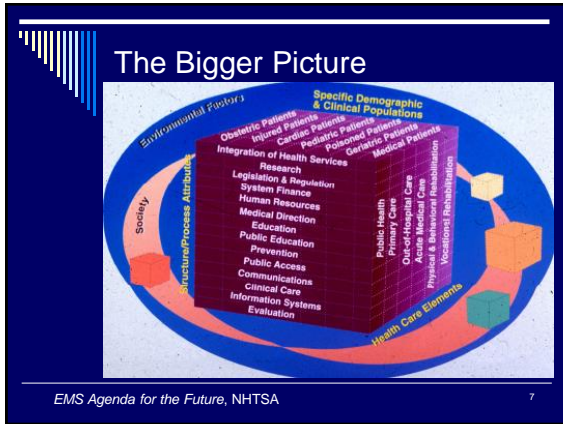
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EMS System



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EMS System 101

- People
- Access
- System Design
- Regulation
- Funding

EMS  **DEDICATED. FOR LIFE.**



EMS People

Licensed

- Medical First Responder (MFR)
 - AKA: Emergency Medical Responder
- Emergency Medical Technician
- EMT-Specialist
 - Advanced EMT
- Paramedic
- Instructor – Coordinator

Non-Licensed


- Dispatch
- Non-Licensed Responders
 - Police
 - Ski Patrollers
- Critical Care Paramedic
- (Physician)

Ambulance Driver



EMS Scope of Practice Universal

- Basic patient assessment
- Basic Life Support
- Oxygen administration
- Oral/nasal pharyngeal airway insertion
- Oralpharyngeal suctioning
- Automated External Defibrillator use
- Splinting and bandaging
- Spinal immobilization



MFR vs EMT (in MI)

- Additional EMT Skills (with MCA ok)
 - King Airway/Combitube insertion
 - Medication
 - Aspirin
 - NTG
 - Albuterol
- EpiPen
 - Optional for MFR (per local MCA)

Public Access Epinephrine

FAAN | THE FOOD ALLERGY & ANAPHYLAXIS NETWORK

Advocacy

Emergency Medical Services

Legislation has been introduced in New York (S. 4478) that would require all ambulances in the state to be equipped with epinephrine auto-injectors.

Epinephrine and Emergency Medical Services (EMS)

New Policy Approved in New York State!

Beginning in May of this year, all ambulances in New York State will be required to carry epinephrine along with other necessary, in accordance with a new policy issued by the state's Bureau of EMS.

Previously, only advanced life support (ALS) ambulances were required to carry the life-saving medication. Although some basic life support (BLS) ambulances have carried epinephrine on a voluntary basis, others have not. All ambulances are equipped with oral and pediatric auto-injectors.

To see the full policy statement, [click here](#).

FAAN would like to thank the Food Allergy Initiative (FAI), along with state lawmakers and Bureau of EMS personnel who helped create this change in policy.

EMS's and Epinephrine

One of FAAN's ongoing initiatives is to help ensure that all ambulances are equipped with epinephrine.

Public Access Narcan



Heroin fight: Benzie County deputies first in state to carry overdose-reversing spray

John Turtolan | jturtolan@mlive.com By John Turtolan | jturtolan@mlive.com

Published on Twitter

on March 14, 2014 at 4:40 PM, updated March 14, 2014 at 5:14 PM

BENZIE COUNTY, MI — The four heroin overdose deaths in Benzie County last year — a county of only 18,000 — hint at a troubling and ongoing social problem, authorities say.

Now, Benzie County Sheriff Ted Schmalz is equipping his deputies with a tool to fight such deaths.

Since December, the department's officers have been carrying naloxone syringes to counteract the deadly effects of an opiate overdose.

It's believed the department is the first police agency in Michigan to carry the doses.

The drug, usually called by its trade name Narcan, costs \$21 per dose and is administered through a syringe with a "needle-safety" adapter.

Injecting the drug into someone's nose can immediately reverse the impact of a heroin overdose. Naloxone binds to opioid receptors in the brain and stops opioids from attaching to them.

"I like to think outside of the box and if there is something we can do to save a life, I think it's worth it," Schmalz said.



An image of a Narcan dose and the needle adapter used to administer it. Courtesy: Benzie County Sheriff's Office

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EMT-Specialist (Advanced EMT) Scope of Practice

- Supra-Glottic Airway Administration
- IV Access
- Medication Admin
 - Epinephrine(1:1000)
 - D50/Glucagon
 - Albuterol
 - Naloxone
- Medication Administration
 - Aspirin



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Paramedic Scope of Practice

- All universal skills
- Airway
 - ET intubation
 - Cricothyroidotomy
- IV Access
- IO Access
- Needle decompression
- Cardiac rhythm interpretation
- 12-lead EKG interpretation
- Manual defibrillation
- Cardioversion
- Transcutaneous Pacing
- Medication Administration
 - ACLS Drugs
 - Analgesics
 - Respiratory meds
 - D50 / Glucagon
 - Anticonvulsants
 - Benadryl / Epi 1:1000
 - ASA, NTG
 - Naloxone
 - Dopamine



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Critical Care Paramedics (CCP)

- Interfacility critical care
- Non-licensed position
 - Expanded scope of practice
 - Requires additional training
- Scope of Practice
 - Ventilator management
 - Additional medications and blood products
 - Chest tube / central line maintenance



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Fewer paramedics means more lives saved

Updated 5/21/2008 8:58 PM ET

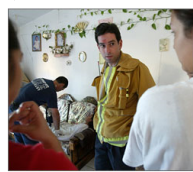
By Robert Davis, USA TODAY

Cities that deploy fewer paramedics — who in turn treat more victims of sudden cardiac arrest — save more lives, according to a new study.

Cardiac-arrest survival rates, considered a key measure of an emergency medical service's performance, vary from city to city. The study of five unidentified cities sought to find factors that have an impact on survival.

"Our data seem to show that cities with the fewest number of paramedics for a given population are more likely to have higher survival rates," says Michael Sayre of the emergency-medicine department at Ohio State University in Columbus. "Having a smaller number of paramedics who are very highly trained is probably a better strategy for delivering good patient outcomes."

Cities use survival from sudden cardiac arrest — an abrupt loss of heart function often caused by misfiring electrical impulses in the heart — as a performance indicator because



Enlarge USA TODAY, 2002

A paramedic examines a girl hit by a car in South Central Los Angeles, as Mario Eldeh, Los Angeles Fire Department's medical director, talks to her parents.

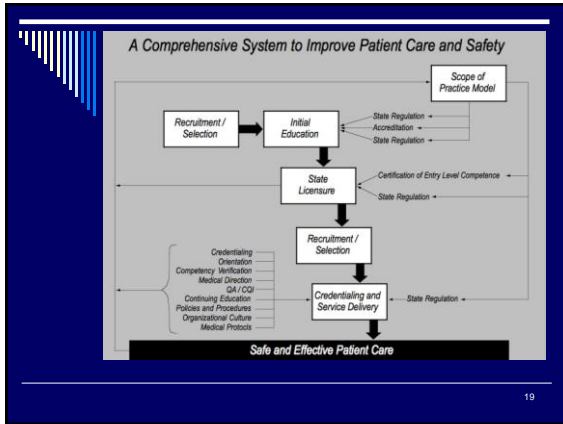
RESULTS FROM FIVE CITIES

The study examined cardiac-arrest survival in five unnamed cities. The findings include:

	City with best outcome	City with worst outcome
Cases of sudden cardiac arrest per paramedic each year	4.7	1.6
Length of time paramedics arrive after first responders	4 minutes	1 minute
Survival rate	27%	4%

Source: Researchers at Ohio State University in Columbus

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EMS Physician



- Opportunities
 - MCA or Agency Medical Director
 - Educational program Medical Director
 - Flight physician
- Michigan MCA Medical Directors
 - Board certified in EM or
 - FT EM with ACLS/ATLS
- AOBEM: Certificate for Additional Qualifications
- ABEM: EMS Subspecialty Certification

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EMS Medical Director Prep

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EMS System Access



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Attitudes of Medical Directors about EMS Dispatch

- That's something that someone else does.
- It's not really clinically related, therefore it's not a medical director thing.
- It involves a separate agency that I have no control over.
- Dispatch just sort of happens and there's nothing I can do to impact it.
- Dispatch is the entry point to the EMS system. If dispatch fails the system fails!

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EMS Dispatch Components

- PSAP = Public Safety Answering Point
 - 911 Center
 - Receives call / determines service needs
 - May perform EMD function or transfer caller
 - May dispatch EMS unit(s)
- EMD = Emergency Medical Dispatch
 - May be co-located with PSAP
 - Prioritizes Call
 - Dispatches EMS unit(s)
 - Pre-Arrival / Post-Dispatch Instructions

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EMS Dispatch Options

- Combined PSAP / EMD
 - All functions co-located in single center
 - May internally transfer for EMD
- Single PSAP / Multiple EMD Centers
 - Multi-jurisdictional Centralized PSAP
 - Multiple (large) ambulance services
- Multiple PSAPs / Single EMD Center
 - Individual jurisdictional PSAPs
 - Single EMS Agency
- Multiple PSAPs / Multiple EMD Centers



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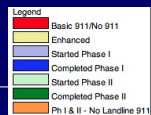
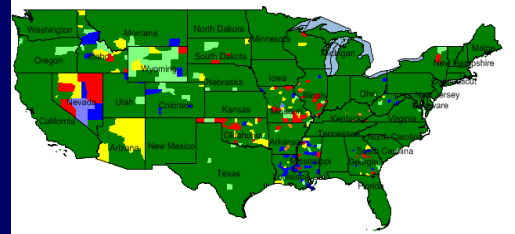
PSAP Operations

- 6,000 PSAPs nationally
- Call Taking
 - Via landline, Via cellular, Via VoIP, (SMS)
- Automated Number Identification (ANI)
- Automated Location Identification (ALI)
 - Typically based on account address
- Transfer of Caller to EMD
 - Or provide EMD services thru call taker
- Dispatch all or some public safety / EMS units

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PSAPs and Cell Phones

- ~70% of 911 calls from cellular
- Cellular – 1996 Wireless 911 Mandate
- **Phase 1:** PSAP receives call back number and location of cell tower
- **Phase 2:** PSAP receives caller's # and location via GPS or triangulation
 - Cellular providers to be ready by 2006 (2012)
 - Local PSAP must request and be able to receive info
 - Locate within 300 m



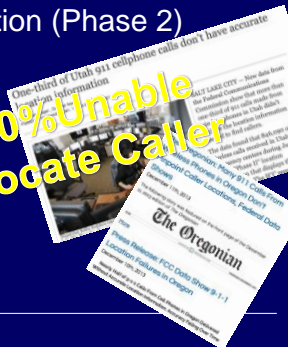
<http://hena.ddti.net/>

Problems with Cell Phone Caller Location (Phase 2)

FCC Information

- California
- Oregon
- North Carolina
- Pennsylvania
- Texas
- Utah
- Washington

35-60% Unable to Locate Caller



Next Generation 911 (NG911)

- Integrate all communications modalities into cloud environment
- Exploit smart phone technology
 - Text messaging, photos, videos
- Emergency Services Internet Protocol (ESInet)
- Many challenges
- Pilot projects underway
- Full implementation >5 years





EMD Operations

- Responsibilities
 - Non-911 Calls
 - Call Prioritization
 - EMS Unit Dispatch
 - Pre-Arrival / Post Dispatch Instructions PRN
- Formal EMD System
 - Protocol Driven
 - Guidecard versus computer
 - Avoids dispatcher free-lancing
 - Various national EMD systems
 - Certifiable programs

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EMD Call Prioritization

- Purpose
 - Send right resource(s) in right mode
 - ALS vs BLS vs BLS+ALS
 - 1st responders as needed
 - Decrease emergency (lights/siren) responses
- Use structured, protocol-driven caller interrogation
- Call Prioritization vs. Call Screening
 - Call Screening – EMS response optional
 - Call Prioritization – EMS response assured

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Why we don't screen calls....

Lawsuit Filed For Boy Whose 911 Call Considered Prank

Attorney Fieger Says Incident Not Isolated



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EMS Unit Dispatch

- Call location
 - Must confirm from PSAP
 - Secondary PSAP: EMD receives ANI/ALI
- Computer-Assisted Dispatch (CAD)
 - Tracks status of all EMS units
 - Documents all EMD activities
- Vehicle Tracking
 - GPS automatic vehicle location system
- Alert responding unit(s)

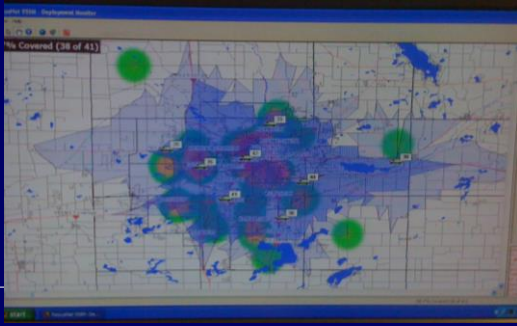
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EMS Dispatch



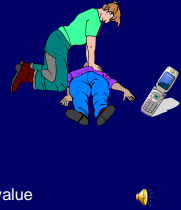
36

Call Prediction and Coverage



Pre-Arrival / Post-Dispatch Instructions

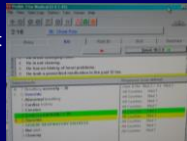
- Provide "Dispatch Life Support"
 - Zero response time
 - CPR (IIA)
 - Where's the public AED
 - Airway Management
 - Hemorrhage Control
 - Assist in Childbirth
- High public expectations
 - Limited published evidence showing value
 - Liability for *not* offering?
- Use EMD Protocol Reference System



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EMD Protocol Reference System

- Key Questions
 - Universal all caller interrogation
 - Purpose: Identify Chief Complaint
- Chief Complaint Protocols
 - Generally 32 Chief Complaints
 - Uses key questions
 - Allows for Call Prioritization
- Scripted Medical Protocol
 - Provides clear, simple instructions to caller



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EMS System Design

"IF YOU'VE SEEN ONE EMS SYSTEM, WELL THEN YOU'VE SEEN ONE EMS SYSTEM"

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How many different ways can a community provide Public Safety Services?

- Police
- Fire
- EMS / Ambulance

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Options for EMS System Design

- Single or Multiple Tier
- First Responders (non-transporting)
 - Basic or Advanced
- Ambulance Service
 - Private vs. Public
 - For Profit vs. Not for Profit
- Personnel
 - Volunteer vs. Paid-on-Call vs. Career
 - Single role vs Dual role

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Tiered Systems

- Single Tier
 - All ambulances at same level
 - All BLS or All ALS
- Two Tier
 - Both BLS and ALS ambulances
 - Dispatch protocols determine response
 - Preserves limited ALS resources
- 1st Response / Non-Transport EMS
 - Typically BLS/MFR
 - ALS 1st Responders
 - with or without ALS ambulance



Ambulance Service Options

- Private, For Profit
- Private, Not For Profit
- Municipal
 - Fire Service
 - Dual Role vs. Dedicated EMS
 - 3rd Service
- Hospital Based
- Municipal (intergovernmental) Contract
- Public Utility Model

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Vehicle Deployment

- Fixed Stations
- System Status Management
 - Vehicles constantly redeployed
 - Based on prediction of need
- Fixed Stations with Dynamic Redeployment

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EMS System Regulation

- Federal Government
 - National Highway Traffic Safety Administration
 - Federal Lead EMS Agency
 - Medicare regulations
 - National Incident Management System (NIMS)
- State Government
 - Public Health Code
- Medical Control Authority
 - State-approved protocols
- Local Government(s)
 - Local ordinance
 - Intergovernmental agreements

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EMS and Local Government

A local governmental unit may enact an ordinance regulating ambulance operations,...

The standards and procedures established under the ordinance shall not be in conflict with or less stringent than those required under this part or the rules promulgated under this part.

- (including MCA state-approved protocols)

MCL 333.20948

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Medical Control

- MI Medical Control Authorities
 - Organized by hospitals (voluntary)
 - Multi-disciplinary advisory body required
 - Medical director required
- Types of Medical Control
 - Indirect (off-line)
 - Protocol driven
 - Direct (on-line)
 - Communications between EMS personnel and EMS physician



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Medical Control / Quality Improvement

- Retrospective
 - Case Review
 - EMS Information System
- Concurrent
 - Monitoring radio traffic
 - Direct medical control (incl. on scene)
- Prospective
 - Credentialing
 - Protocols
 - Education

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Challenges in Medical Control

- Ethical vs. legal responsibilities
- Quality improvement
- Personnel credentialing
- Liability for actions (omissions)
- Funding of medical direction
 - Volunteer
 - Separate contract
 - Employee
- Support services

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EM\$ Funding

- Transporting Agency
 - Fee for service
 - Medicare, Medicaid, 3rd party payers, etc.
 - Unable to pass on additional costs
 - Subscriptions
 - Governmental subsidies
 - Fund raising, grants, etc.
- Non-Transporting
 - Tax supported
 - Fund raising, grants, etc.
- Medical Control Authorities
 - Hospital funding
 - Direct / In-Kind
 - Provider agencies
 - Voluntary contributions

Federal Funds via HHS, FEMA are available to support some EMS activities

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EMS System Design vs. Cost

		PERFORMANCE	
		Low	High
COST	Low		
	High		

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EMS Wacker Opportunities



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Summary

- EMS Systems are more than just ambulances
 - Highly complex
 - Integration of system resources is a key to success
- Many opportunities for emergency physicians in EMS and disaster medicine



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Good Resources

- EMS Agenda for the Future
 - <http://www.nhtsa.dot.gov/people/injury/ems/agenda/index.html>
- National Assoc. of EMS Physicians
 - www.naemsp.org
 - *Prehospital Systems and Medical Oversight*
- Institute of Medicine
 - <http://www.iom.edu/?id=35029>
- Michigan College of Emergency Physicians
 - www.mcep.org
 - EMS Committee



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Questions

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